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ABSTRACT

This study examines the interaction of individual differences in pupils' temperament and ability with variations in educational strategies used in elementary school classrooms. This interaction was analyzed by re-examining the data from 2 previous studies of the effects of various educational strategies on social and academic behavior problems. Both studies used the Barclay Classroom Climate Inventory (BCCI) to identify problem areas and to group children into 6 temperament-aptitude clusters. The first study involved children in traditional, open, and behaviorally oriented classrooms in Terre Haute, Indiana. These children were tested 3 times for achievement and BCCI placement as they progressed from grades 3 through 6. The second study involved the application of 2 group counseling approaches in fourth and fifth grade classrooms in Zebulon, Georgia. The BCCI was administered and behavioral observations were made at the beginning and the end of the 6-week treatment period. Results from parametric and non-parametric analyses of the data indicated the existence of various temperament X treatment interactions. The results also suggested that certain treatments enhance the development of certain temperament groups while blocking the development of others. The study indicates the importance of considering individual differences in the planning of educational strategies. (BD)

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TEMPERAMENT CLUSTERS AND INDIVIDUAL DIFFERENCES IN THE ELEMENTARY CLASSROOM *

A SUMMARY

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December 16, 1977

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When means are found to identify temperaments that thrive in the more open classroom environment and those that thrive in the more traditional ones, it will probably be discovered that these distinctions can confer great benefits on a great many children in both of these general categories. This might be one of the great breakthroughs to meeting individual children's real needs on a more individual basis than educational innovators have been looking for.

B. Z. Friedlander, 1975

General instructional theory, I think, is a holy grail.

R.E. Snow, 1977

PS010112

*Paper prepared for presentation and comment AERA National Meeting March 28-31, 1978, Toronto.

23-08

Temperament Clusters and Individual Differences in the Elementary Classroom [1]

Introduction

The purpose of this study is to document the fact of what I shall term temperament-aptitude clusters of human characteristics as a moderating variable in susceptibility to educational treatment and rate of developmental change. The subject is important and timely. It is important because the concept of temperament has been known from antiquity and has never really been abandoned either by researchers or by the vast majority of people who make judgments about personality characteristics based on observational empiricism. It is timely, because there is currently support for an interaction theory of individual differences and learning outcomes, and a recognition of the hopelessness of simplistic solutions to complex problems.

Rationale

All science to a large extent seeks to provide an adequate analog to explain natural phenomena. Man himself is no exception to this process. Thus one of the earliest approaches to the explanation of man's behavior was related to temperament. Galen and Hippocrates both felt that temperament characteristics were related to balances between primary determinants of air, earth, fire and water. In more modern times Kreschmer, Sheldon,

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[1] This is a long abstract of a more detailed work on the subject. For the detailed analysis and inspection of tables the reader is referred to the original document.

Eysenck, Thurstone, and many others have provided evidence supporting much of the older judgments of antiquity by modern factor analytic methods.[2] In addition longitudinal studies by two separate sets of investigators (Buss & Plomin: 1975, Thomas and Chess: 1977), provide still further support for the existence of activity-passivity, impulsivity-control, seclusive-social dimensions in human personality and behavior. But different from earlier speculations and observations, the more recent view regarding temperament is that the effects of hereditary endowment interact with different environments to provide an explanation of much of human behavior. With the advance of biological science it is not inconsistent to view the templates of DNA that specify the pattern of growth and development in the human organism as being also related to components of intelligence, emotive reactivity, and susceptibility to change. It is useless to argue anymore that either heredity or environment can account for the variability of a majority of human behaviors.

The existence of such interactive modalities in man is not really doubted. The explanation of the differences is more controversial.[3] The method of assessing such differences is

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[2] Eysenck and Rachman (1965) provide a diagrammatic analysis of the results of factor analysis matched to the older temperament categories(p. 16).Eysenck(1970) also reviews a variety of efforts identifying basic extroverted and introverted dimensions obtained through structured personality testing.

[3] For example, Mischel (1968) from a behavioral point of view believes most of these differences are related to human perception. Very likely they are. For the uniformity of perception itself is an argument for the existence of such temperament characteristics. As Leibnitz retorted to Locke's dictum "Nihil est in intellectu nisi prius in sensibus"(nothing is in the intellect unless first in the senses) - "excipe intellectus" (except the intellect itself),behaviorism begs the question.

often obscured by psychometric and statistical manipulations.

More by accident than design I discovered a method for identifying what I shall call temperament-aptitude clusters. Over a period of twenty years I have worked on the development of a multi-trait, multi-source instrument for evaluating the elementary school classroom climate. This instrument is called the Barclay Classroom Climate Inventory.[4] Based on the perception of functional skills in outdoor mechanical, scientific-intellectual, social-conventional and enterprising dimensions, self evaluation is compared with peer and teacher evaluation. The results of this process provide six multi-source factors, and further factor analysis yields six types or temperament groups. These six groups, formed by a statistical process show distinctly different patterns of self competency, interests, and skill levels. Moreover, they also differ markedly in both level and rate of achievement and intelligence.[5] Thus in effect, the consequences of a multi-trait, multi-source skill analysis yield a coherent and consistent set of characteristics equatable with a temperament-aptitude concept.

Method

The existence of such temperament-aptitude clusters is relatively easy to document both by factor analysis and multiple discriminant analysis. But do these clusters show a differential

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[4] The Barclay Classroom Climate Inventory has been commercially available since 1970-71. There are over 50 published and unpublished studies. These are described in the original monograph. More information about the inventory and the system is also provided there.

[5] These statements are based on analyses with the instrument and longitudinal patterns of achievement. They are also documented further in the original study.

susceptibility to educational treatments ? This is the core question, for if such groupings of characteristics do not have any relationship to alternative treatments, then they are meaningless.

In order to explore this relationship a post hoc data analysis was done. Two studies which had been analyzed previously were re-analyzed. The first of these studies was done in Terre Haute Indiana from 1972-1975. This study involved three intact school treatments. The treatments were: (1) a traditional approach, (2) an "open" school approach, and (3) a behavioral approach. Children were originally assessed on achievement and BCCI variables in 1972, again in 1973, and finally in 1975. They thus progressed from the third grade to the sixth grade during these years. The second study involved the application of two group counseling approachs to children in the Zebulon, Georgia schools.[6] The two treatments were: (1) a rational-emotive therapy approach to reducing problem behavior, and (2) a DUSO affective approach for the same purposes. There were pre and posttestings on the BCCI and behavioral observations separated by approximately six weeks of treatment in the fall of 1976.

In the Terre Haute study there were 183 subjects originally assessed in the third grade and later assessed in the sixth grade. In the Zebulon study there were 195 subjects assessed in the fourth and fifth grades. In each study children were characterized for data analysis purposes into the BCCI group they belonged.

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[6] The Terre Haute Study involved many more children than this small group and was designed primarily to look at the achievement effects from the experimental school (the behavioral). It has been analyzed by Barclay, Covert, Stilwell & Scott (1975). The Zebulon study focused on self-control problems and is the Ph.D dissertation of P.W. Buffington (University of Kentucky, 1978).

The output of the BCCI is generated by a computer analysis of both scale and factor scores. The scale and factor scores result in data susceptible to traditional parametric analyses. In addition, certain clinical judgments are made relative to the configuration of data that generates indices relating to suspected problems in :(1) self-competency, (2) group interaction, (3) self-control, (4) verbal production, (5)physical energy deployment, (6) cognitive-motivation, and (7) attitude towards school. These latter data are susceptible to non-parametric data analysis.

The overall paradigm for data analyis was a sex by BCCI group, by treatment model. In the parametric analyses an ANCOVA was used on each BCCI variable and factor score separately with the pre-test as the covariate. In the non-parametric data analysis the same overall paradigm was used by the dependent variable was change in frequency of suspected problems. Where the frequency increased, the judgment was that the original condition had worsened. Where the frequency decreased, the judgment was that the original condition had improved.

The target outcomes were two-fold. For the parametric analyses specific attention was directed at the three-way interactions (sex times group time treatment). For the non-parametric analyses a ratio index was calculated for the same components.[7]

[7] The ratio index was: $\text{Index} = \frac{\text{Sum of + Changes} - \text{Sum - Changes}}{N - 1}$
N = number of observations.

The output of this analysis yielded 80 three-way interactions for each of the two studies (sex time group times treatment) on 34 raw scores and six multi-source factor scores. Five three-way interactions were significant for the Terre Haute study, and seven three-way interactions for the Zebulon study. Nearly 400 contrasts were obtained from the analysis of the non-parametric data.

Such a mass of data outputs becomes mind-boggling to interpret. Thus a transformation was designed to provide a simple explanation of what the study is all about. The three-way interactions on the parametric outcome data were all generally related to the increase or decrease of sociability-affiliation measures. The thirty-six pre-post means for the Terre Haute Data, and the twenty-four pre-post means for the Zebulon data were looked at in terms of gain or loss on measures relating to sociability-affiliation. A weighted score for each sex times treatment times BCCI group interaction was obtained across all significant interactions. This weighted score then represented a derived transformation expressing in an ordinal continuum rate of change per group.

In similar manner, the non-parametric data was transformed by adding 100 to each ratio (some ratios were negative showing loss rather than gain).

In summary, the following steps detail what was done:

1. Three-way ANCOVA interactions were transformed into a change index on an ordinal continuum.
2. Three-way Non-Parametric Change Ratios were transformed into an ordinal continuum.

3. Intervals on the ordinal continuum were converted to standardized T scores.

This procedure not only included the raw analysis of data, but made it possible to compare the pre-post outcomes, both parametric and non-parametric in a similar method and metric.

Results

In this summary overview of the study I shall not deal with sex times group times treatment graphs, but confine the results section to the group times treatment outcomes.[8] Table 1 provides the summary graphs for the parametric outcomes, and Table 2 provides the summary graphs for the BCCI groups on all changes relating to suspected problems. Table 3 then provides the summary graphs for the effectiveness of each treatment on each suspected problem area. Finally, Table 4 provides the standard scores appropriate to the interpretation of the graphs.

To expedite the interpretation of these findings, I shall discuss first the consequences viewed by BCCI temperament cluster group. Then I shall briefly note the consequences of the treatments by suspected problem areas with all groups taken together. Finally, I shall state some summary conclusions.

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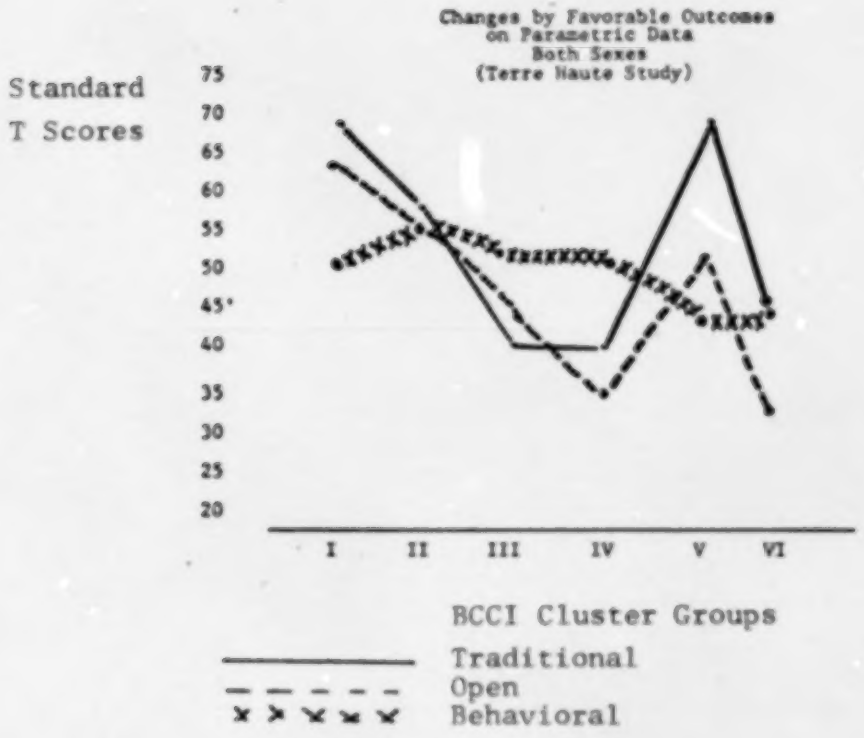
[8] The three-way interactions were most appropriate for the parametric data and were so analyzed. But because of the nature of the suspected problems data and the limitation of cell size (sex times group times suspected problem times treatment) it was not possible to extend the analysis that far. Thus, for summary review purposes this abstract will not consider the sex times group times treatment interactions. They are, however, discussed in the larger paper.

Table 1

Changes on Parametric Outcomes



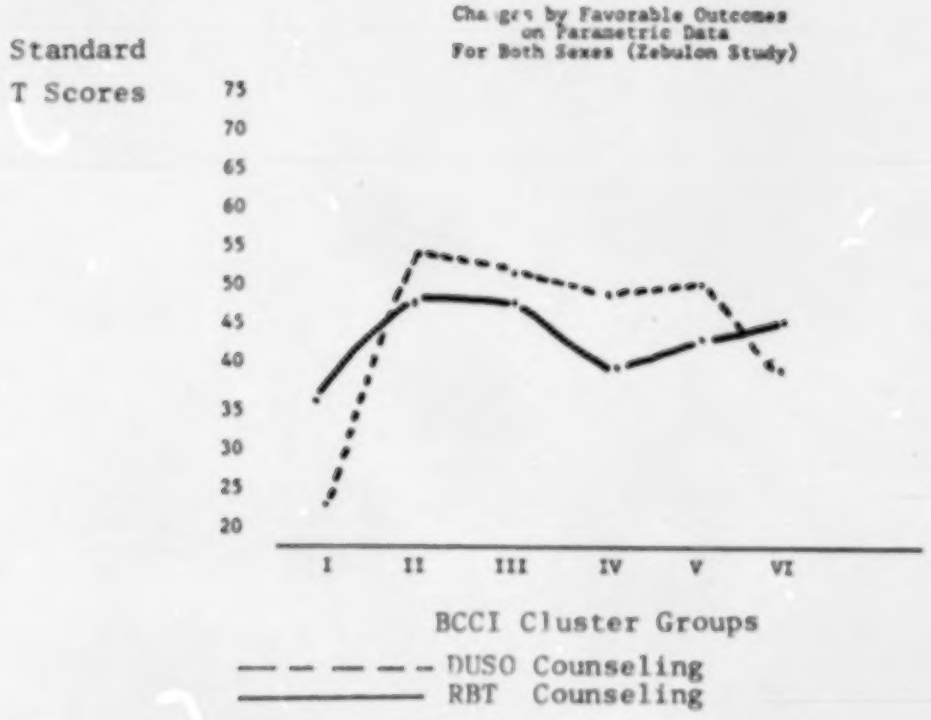
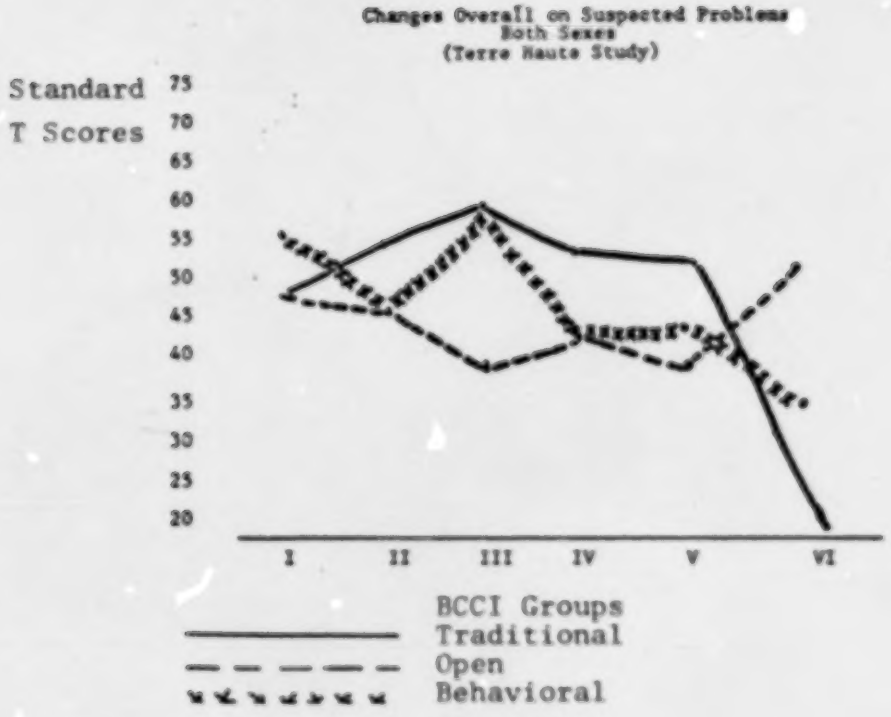


Table 2

Changes on Non-Parametric Data Outcomes



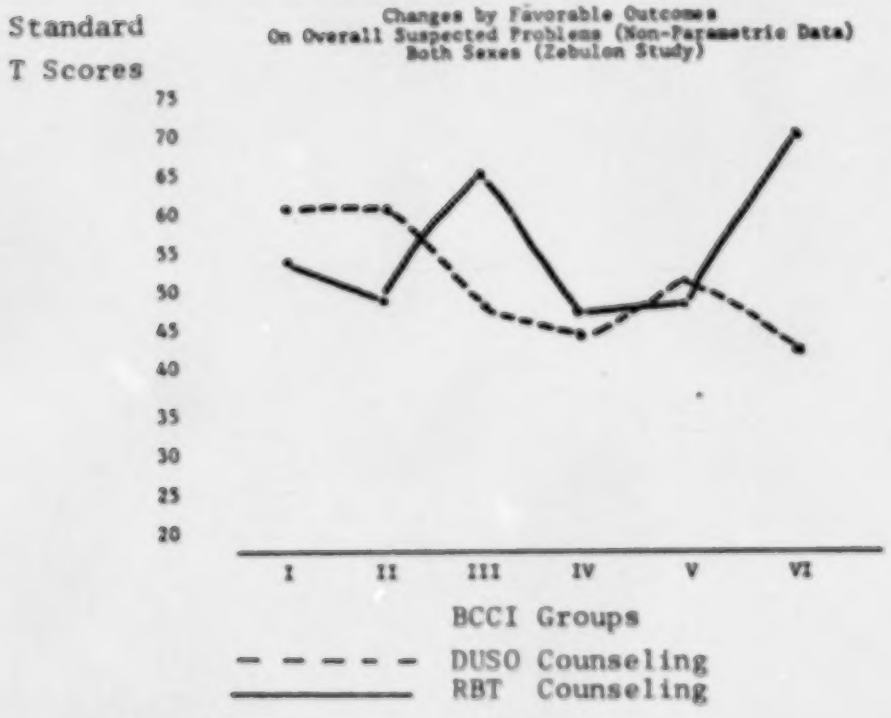
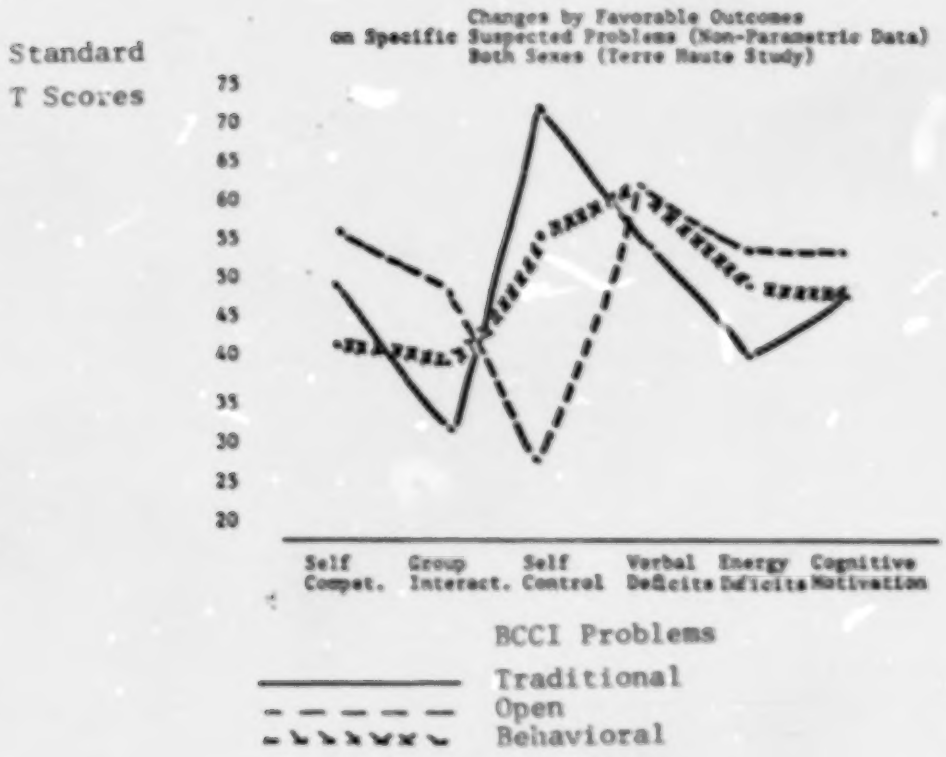


Table 3

Overall Changes on Suspected Problems



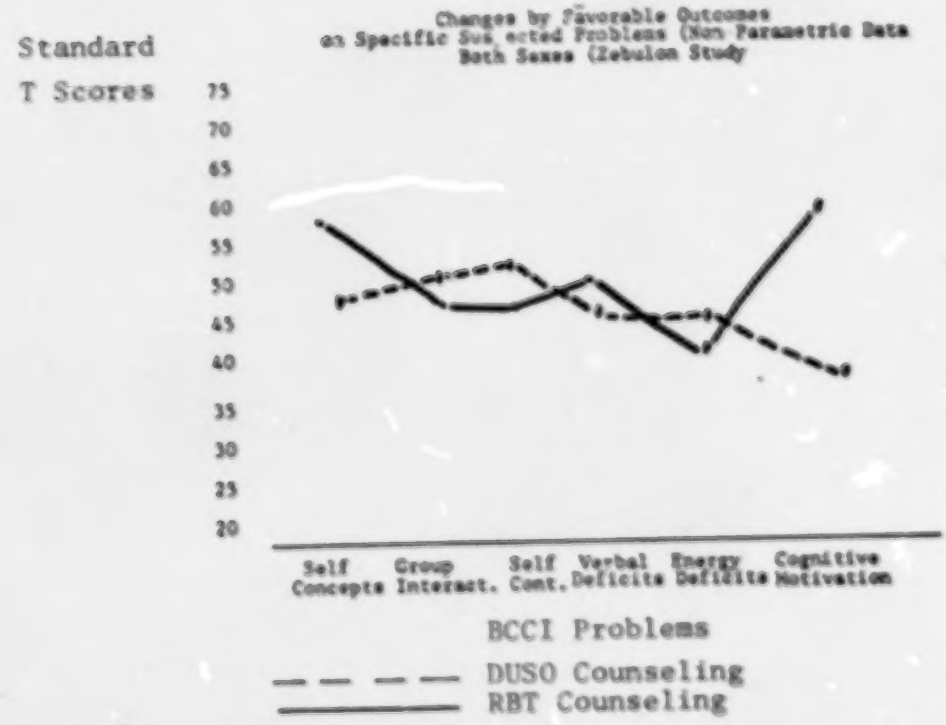


Table 4

Standardized T Score Means of Change Scores

Non-Parametric Data
Changes on All Problems by Group & Treatment

BCCI Group	Traditional	Open	Behavioral	DUSO	RBT
I	48.76 (14)	48.76(17)	55.56 (8)	61.09(12)	54.16 (12)
II	55.76 (15)	48.76(13)	48.76 (7)	61.09(18)	46.51 (17)
III	61.56 (8)	39.54(16)	61.56 (14)	46.51(20)	63.48 (32)
IV	55.56 (15)	48.76(7)	48.76 (3)	44.24(16)	46.51 (12)
V	55.56 (13)	42.37(8)	48.76 (7)	51.00(12)	48.76 (12)
VI	18.33 (8)	55.56(7)	35.94 (3)	42.53(23)	68.28 (10)

Note: number in parenthesis is N of subjects.

Non-Parametric Data
Effectiveness of Treatments on Specific Problem Areas

Problem Area	Traditional	Open	Behavioral	DUSO	RBT
Self-Competency	48.94	55.19	42.73	48.94	57.30
Group Interaction	30.32	48.94	39.66	51.72	48.94
Self-Control	73.76	27.11	55.14	54.92	48.94
Verbal	55.14	61.13	61.75	48.94	51.72
Energy	38.66	55.14	48.94	48.94	43.35
Cognitive Motivation	48.94	55.14	48.94	40.56	62.90
N subjects	73	68	43	100	95

Table 4 (continued)

Parametric Data

Changes on Three-Way Interactions by Group & Treatments

BCCI Group	Traditional	Open	Behavioral	DUSO	RBT
I	67.58	62.81	50.09	26.23	37.73
II	59.63	56.45	56.45	60.70	51.91
III	40.56	42.15	51.68	60.70	54.96
IV	40.56	34.20	50.09	56.87	43.47
V	67.58	51.68	42.15	60.70	49.22
VI	46.52	34.20	45.33	49.22	53.04

Note: number of subjects same as first portion of this table.

Temperament-Aptitude Groups

Group # 1

Children in this group have been earlier characterized as controlled, introverted, individualistic, and energetic (Barclay, 1977). They tend to be persistent in academic tasks, good in achievement, and sometimes show a tendency towards reticence. Positive growth and change was observed through use of both the traditional and open school formats, but neither counseling technique aided this group in making positive changes. With regard to suspected problems, the behavioral and DUSO methods appeared to be most effective in reducing problem behaviors.

Very likely children in this grouping have a high degree of internal motivation and control. With this may also go a higher degree of internal anxiety. Thus, it is consistent with their personality characteristics that they might resist interventions viewed somewhat as contrived. They have found some degree of consistency and support through the traditional format of structure, and probably feel that a situation clearly defined can be most secure for them. On the other hand, they also seem to find some benefit from the open format in which their own individuality can be further developed.

Group #2

Children in this group usually possess the highest degree of social power with both teachers and peers. They often have high aspirations for the future, and their achievement is the highest of the groups. An inspection of the profiles for this group suggests that all three learning approaches and both counseling approaches were relatively ineffective in making great change. Only the traditional approach and the DUSO treatment showed a high

level of effectiveness. This finding is quite consistent with the characteristics of the group. After all, they have achieved a considerable amount of status with the peer group, have good relationships with the teacher, and have been reinforced by their own achievement. Very likely, their social adaptability plays an important role in the fact that they appear to be able to profit - to some extent - from whatever format is utilized within the classroom setting. Nonetheless, the traditional structured format appears best overall, and DUSO as a counseling treatment is one that they can utilize with others at no risk to themselves and their status.

Group # 3

Children in this group often need an increase in peer and teacher support. They are sometimes isolated and have multiple problems in meeting the expectations of the school. In terms of achievement, they are often among the poorer achievers and those who show multiple learning and social-affective problems.

When one examines the profile of gains for this group it is apparent that many of the treatments helped this group. The traditional format, the open format, and the DUSO counseling treatment were all successful in effecting positive changes on social-affiliative status. In terms of diminishing areas of suspected problems, the traditional, behavioral and RBT approaches were also very successful.

Of all the groups this one made the most changes in response to the alternative treatments. It is very likely that children with these characteristics recognize the fact that they have not been able to achieve average adequacy. For this reason, it is also likely that given any alternative approach that may help them achieve a

higher level of interpersonal competency or learning, they are susceptible to change. With a history of inadequacy and failure, many of these children are highly susceptible to influences from new treatments. This is confirmatory of what Bandura and Walters (1963) have observed about children with a history of failure being more prone to modeling influences.

Group # 4

Children in this group often possess a striving towards leadership, but in many cases fail to achieve the social power and influence they seek. They are inconsistent achievers and often have the poorest record of achievement. Very often these children are viewed by some of their peers and by their teachers as difficult children who are impulsive, acting-out and prone to behavior problems.

An inspection of the outcomes of change for this group indicates that no treatment effectively and clearly helped this group. DUSO appeared to aid somewhat in the development of better interpersonal relationships on the parametric data, and the traditional format helped somewhat in the reduction of problems, but neither of these were really high levels of change power.

Such findings are not altogether unexpected. For this group is most likely very highly externally controlled. Responsibility for personal behavior is more often shifted away from self. The existence of many suspected problem areas, specifically in the areas of self-control and attitude, suggest a stance towards school work and relationships in the school in which little personal responsibility is assumed. As a consequence, behavior can alternate between aggressive responses and sullen passivity. Moreover, typical efforts at leadership are often frustrated.

Group #5

Children in this group tend to be energetic, task-oriented and good solid citizens. They are often viewed as leaders, and show a good level of achievement. They are generally academically motivated and perform well in task-oriented situations. Both the traditional approach and the DUSO technique were effective in developing higher levels of interpersonal competency and affiliation. The traditional approach was also best in reducing the level of problems.

The outcomes observed for this group appear consistent with their characteristics. As solid citizens, who sometimes achieve leadership status, they are probably more familiar and confortable with the structured demands of the traditional format than another format in which they may lose their status. Thus, they are not as malleable and confident as group # 2 in coping with alternative approaches, nor as anxious as group #1.

Group # 6

Children in this group tend to be the low average group in the BCCI typology. They have some friends, usually do about average in academic tasks, and show a range of varied problems. Thus, they seem to be more capable both academically and socially than either of the other two groups in the lower portion of the BCCI grid. But because they neither show the lowered academic achievement of these two groups, nor the variety of problems usually observed in group # 4, they are often ignored in efforts at remediation in learning, and are not targets of added attention in teacher-oriented social-affective interventions.

None of the parametric analyses showed a highly significant method favorable for effecting positive growth with this group. In fact, the only approach that showed some positive tendency was that of RBT. This was the same one found to reduc suspected problems for this group also.

This finding, also makes considerable sense given the characteristics of this group. Though they presumable achieve relatively well, and do their work, they are often ignored because they are obviously not amongthe leaders of the class, and are likewise not among the poorer achievers or more severe problem cases. As a consequence, one way to achieve more notice is to become more assertive. RBT with its emphasis on assertiveness and self-determination provides a highly supportive technique to this group for saying to everyone: "hey notice me !"

Problem Effectiveness

In this area, positive responses are indicated by decrease in the level of suspected problems. With regard to self-competency, the RBT counseling approach and the open school format appear to be the best for increasing self-competency over all groups. None of the approaches help much in terms of enhancing group interaction. DUSO shows some slight advantage over the other methods. On self-control, there is a wide discrepancy in treatment effectiveness. The traditional structured approach is extremely effective in reducing self-control problems (73.76) whereas the open school format is extremely adverse in the same area (27.11). Verbal deficits are decreased by both the open and behavioral formats, and energy deficits appear to lessen more in the open format than in the other approaches. Finally, RBT and the open school format appear to be most helpful in promoting cognitive

motivation and task-order behavior.

Overall Treatment Effectiveness

When we look at the overall effectiveness of treatments on groups and suspected problem utilizing the criterion of a change score of 60.00 or above (one standard deviation above the mean change score), it becomes evident that certain treatments are more effective with certain groups than with others, and also that certain treatments have a negative leverage or base in effecting positive change.

The traditional structured approach appears to be effective with all the groups but# 4 and #6. It is also the most effective treatment overall for decreasing self-control problems. Thus, the traditional structured classroom setting appears to be a preferable mode of developing certain social-affiliative behaviors and reducing suspected problems for a large portion of the classroom population. On the one hand it appears to be effective for those who already have mastered the tasks of the setting e.g., the energetic and socially accepted (groups # 5 and # 2), and on the other hand it appears to be effective with the introverted groups (groups #1 and #3), a finding consistent with Eysenck's contention about the higher conditionability of introverts (Eysenck & Rachman, 1965).

The open format appears to show only a moderate effectiveness with introverted groups (groups #1 and #3). Perhaps the freer atmosphere engendered by the open classroom and larger groups of children with teams of teachers may make it possible for those who have been relatively well stereotyped in the smaller classroom units to try out new styles of behavior without the risk that might attend such behavior in a more structured setting. Likewise children with

academic problems and other affective-social ones for the same reasons, may not be categorized so easily in the large assembly of cross-graded groups and multiple teachers. The open format appears to be helpful in increasing cognitive motivation and verbal skills, but is positively detrimental in terms of problems relating to self-control.

The behavioral format appears to have a limited effectiveness. It appears to be most effective in the overall reduction of problems for group #3. This is the group with a general record of underachievement (by comparison with the classroom tendency), and the group in which there are usually a host of cognitive-motivation and verbal problems. This approach overall appears to be effective also with verbal problems. What this finding appears to indicate is that a behavioral approach may be quite effective in both reducing problems and promoting achievement in children who are slow learners or who have some achievement-related problems.

DUSO as a counseling technique appears to be effective in promoting social-affiliative changes in cells # 3, #5, and # 2. As a method for promoting self-understanding and accenting positive interpersonal relationships, it appeals to these groups for various reasons. For groups # 5 and # 2 it can only enhance their already existing self-esteem and social power. For group #3 (who in many instances may be the covert recipients of such positive strokes from others) it can provide a beneficial alternative for building new interpersonal relationships and possible changes in teacher expectations relating to achievement learning

RBT similar to the behavioral approach appears to be most effective with group #3. Given the emphasis on assertiveness in this approach it makes sense that individuals who have had a history of failure and poor achievement might be willing to try any approach that would provide them with some reasonable alternative to failure. This is consistent with what Bandura has indicated about children with a history of failure being more susceptible to modeling influence (Bandura, 1968). RBT also appears to be overall effective in promoting cognitive achievement. Possibly this is because RBT stresses self-accountability. This may help to increase greater effort in task-order achievement.

Summary

We may summarize the overall findings of this study as follows:

1. In terms of positive change, the traditional structured approach to classroom learning tends to foster the most positive social-affective growth in children. It is particularly effective in reducing self-control problems. It does not appear to be effective with passive-aggressive children (#4).

2. The open school format appears to be effective with children who are characterized as introverted, individualistic, and who have problems in verbal reticence or openess. It is conducive also for raising cognitive motivation. But it is particularly detrimental in the establishment of self-control procedures.

3. The behavioral approach has minimal effects relative to either the increasing of social-affiliative characteristics in children or the reduction of problem behavior. Where it appears effective is with children who have a history of poor achievement.

4. RBT is effective chiefly with children of low-average achievement who also have a history of problems either in the academic or social-affiliative areas. It does, however, appear overall to be an effective technique for promoting verbal skills and cognitive motivation.

5. Children who have a high support system (liked by peers and teachers) and who represent an energetic task-oriented approach to learning with resultant success for their efforts (#2), tend to be able to benefit from any of the approaches.

6. Children who are more introverted and individualistic(# 1 & 3) are more susceptible to treatments overall than children characterized as extroverted and sociable

7. Children who are typically underachievers, who manifest many self-control and group interaction problems, and who may be classified as passive-social or passive-aggressive (#4) do not gain appreciably from any of the classroom treatments detailed in this study.

Implications

In every research study of this nature the nagging question is: how consistent and generalizable are the findings ? Two studies have been reported here. The BCCI group assignment process, based as it is on a statistical assignment acts as a very sophisticated matching process so there is an isomorphic perceptual equivalence between population groups. This helps from an internal consistency viewpoint. From an external point of view one may look at consistency with other research trends and replication. In the first instance there is considerable consistency of these findings with research in the locus of control area, anxiety, achievement-motivation, and achievement.[9]

With regard to replication, a chance event occurred that provides an example of system replication . This was Bennett's study

[9] I am not citing references with regard to these consistencies in this paper because it is an abstract of the larger work. But in the larger work considerable evidence is cited with regard to the consistency of specific findings relative to locus of control studies and to achievement-motivation styles. These studies define characteristics of subjects which are consistent with groupings of the BCCI system.

of 1975 and reported in 1976 (Bennett, 1976). He wished to look at student progress in what he termed formal and informal education. The former consisted of traditional English elementary school education, the latter was characterized more by progressive methods. He characterized teachers by their styles, assessed children pre and post on a personality inventory, sociometric ratings and behavioral observations, and tested their progress over a year by English, Mathematics and other achievement tests. Out of his study of student characteristics he derived eight clusters whose description are very similar to certain BCCI temperament-aptitude groups. Since he had very similar measures, tested progress both by achievement and personality characteristics, it was possible to equate groups between Bennett's study and my own. In the larger study I cite rho correlations between group tendencies observed in my own study and those observed independently by Bennett.[10] There is a close relationship between the findings from these two systems in which similar methods were utilized.

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[10] The publication of Bennett's book Teaching Styles and Pupil Progress occurred in the spring of 1976 when I was on sabbatical in England. It sparked considerable controversy and newspapers and journals were filled with commentaries pro and con. The findings of Bennett intrigued me because of the similarity to my own findings. I wrote to Bennett and was invited to Lancaster where we spent part of a day discussing the project he had completed. When I arrived in his conference room I was surprised to see the BCCI manual and materials sitting on a table. He said:" You see I was also interested in talking to you." In the course of the conversation he indicated that he was most interested in what I had done, but the use of my instrument would not have been feasible in his study. However, he did indicate that he utilized similar instruments available to him and in the literature. I am happy that Bennett did what he did because it demonstrates quite independently, given the rationale for tapping psychological support systems, that a variety of similar type instruments may yield similar cluster groups and research outcomes.

There are many implications from the findings of this study. For if temperament-aptitude clusters exist that can be defined statistically, and if these clusters do represent psychological semi-permeable membranes, then we should not ignore them in educational planning. The voices that cry for a complete mainstreaming of children because this approach is least restrictive for slow learners and mentally retarded should consider whether this approach is not restrictive to gifted and creative children. There is, in fact, evidence from the BCCI itself that mainstreaming has deleterious effects on the social development and self-competency evaluation, as well as teacher expectations of mentally retarded children (Kehle & Guidubald in press,1978). Again, the urge for mastery learning and competency based instruction, though commendable in themselves, may be fostering a dependence on external criteria of performance which may be almost classical in maintaining an external locus of control in children and teachers. If internal locus of control is a value orientation central to personal and social responsibility taking, then methods fostering external locus of control, may in the long run decrease personal and social responsibility.

Still further a considerable degree of accuracy is obtained within this procedure for evaluating the achievement and intelligence level of children. Though certainly the use of a social-affective skill measure is not a substitute for more accurate specific measures, one wonders why schools continue to utilize assessment procedures that are nearly always filed and not utilized in planning, when it is possible to evaluate children

in a more comprehensive manner utilizing the results for actual prescriptive interventions, groupings, and alternative curricula.

But perhaps the most important finding of this study is the fact that certain temperament-aptitude cluster groups tend to benefit from an educational treatment that blocks the development of another temperament-aptitude group. Those who are winners tend to become better winners. Those who are losers tend to worsen. Can a unitary system of education both provide stimulation and modeling for retarded children and foster creativity in the gifted ? Can children who already exhibit field-dependent styles of behavior become field-independent in a competency-based or mastery linked system of measuring educational outcomes ? Is it possible to be equal and excellent too (Gardner, 1961)?

Cronbach and Snow have provided an explanation of this problem based on the fundamental nature of heredity-environmental interactions.

> The idea that environments and heredities can be rank-ordered still confuses thought. Thus, when an heredity times environment interaction is invoked, e.g., to explain differences and similarities in twins, the layman usually thinks of a ranking of heredities and a ranking of environments, whose merits combine multiplicatively as well as additively. Interaction is thus interpreted as merely the mutual reinforcing effect of two pushes in the "good" direction. This view is more wrong than right. Genetics has established a multi-variant conception of environments and of heredities and recognizes that the ecology that benefits one genotype blocks the development of another. A similar complexity is required in thinking about social environments (Cronbach & Snow, 1977, p.10 - italics mine).

The recognition of genotype-environment interaction blocking is probably the most important covert item in education today. It poses a dilemma of truly formidable proportions. For if it is

to be ignored - for reasons of either political pressure or supposed curriculum economics, then it is most likely that the status of educational research will continue with ungeneralizable outcomes similar to those reviewed comprehensively by Averch et al. (1972). Some treatments will work with some children, but no single approach will work with all. The failure to take into consideration temperament-aptitude clusters will constitute a large and continuing source of error variance.

The opposite alternative is equally formidable. For this alternative suggests a multi-temperament, multi-method approach to educational outcomes. What seems highly necessary is the development of a technology for classification and evaluation that is powerful enough to evaluate outcomes of process learning and sensitive enough to reflect philosophical goals in local educational efforts. The matching of student characteristics, alternate teaching styles and characteristics, with different educational outcomes.[11]

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[11] A moot question is the extent to which monolythic educational indoctrination systems can influence the genotype-environment interaction. Very likely those thoroughly indoctrinated in communism may still exhibit the alternative success vs.failure continuities with varying degrees of external vs. internal locus of control. The same contention may be true in a programmed social development society as conceptualized by behaviorists or our present personal-social responsibility approach for a democratic society. No one really knows whether the social environment can in a short period of time (relatively speaking) effect genetic changes or functional changes in behavior. Jaynes (1976) has recently argued that the social organization of urban cultures in the near east facilitated the breakdown of the bicameral brain, and the emergence of many attending problems in anxiety, neurosis and conflict. Though an interesting hypothesis, if it is true, the consequences would take considerable time.

In conclusion, the evidence in this study is such that it provides a reasonable epistemological certitude about the existence of temperament-aptitude-treatment interactions. Though one can conclude this study with the usual hortatory appeal to more research, my preference would be to say that there are some specific research hypotheses here which merit further investigation. For example, what kinds of experiences teachers and methods can help group #4 ? Will alternate approaches to learning make a difference with group # 3 ? What kinds of teachers are most facilitating with varying groups of children ? What kind of balance can be built between traditionally structured, "open" and behavioral approaches that will facilitate and not block development? Such steps appear to be a logical extension of this research effort.

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